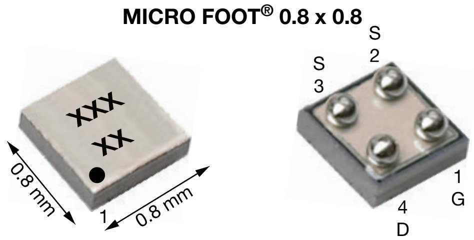
N-Channel 30 V (D-S) MOSFET

MICRO FOOT® 0.8 x 0.8



Backside View   Bump Side View

Marking code: xx = AR

xxx = Date/lot traceability code

PRODUCT SUMMARY	
V_{DS} (V)	30
$R_{DS(on)}$ max. (Ω) at V_{GS} = 10 V	0.128
$R_{DS(on)}$ max. (Ω) at V_{GS} = 4.5 V	0.131
$R_{DS(on)}$ max. (Ω) at V_{GS} = 3.7 V	0.134
$R_{DS(on)}$ max. (Ω) at V_{GS} = 2.5 V	0.143
Q_g typ. (nC)	2.4
I_D (A) [a]	2.2
Configuration	Single

FEATURES

- TrenchFET® power MOSFET
- Ultra small 0.8 mm x 0.8 mm outline
- Ultra thin 0.39 mm max. height
- Typical ESD protection 1700 V (HBM)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

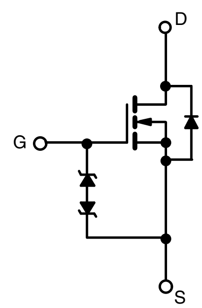
Pb-free

RoHS COMPLIANT

HALOGEN FREE

APPLICATIONS

- Load switch
- OVP switch
- High speed switching
- DC/DC converters
- For smart phones, tablet PCs, and mobile computing



N-Channel MOSFET

ORDERING INFORMATION	
Package	MICRO FOOT® 0.8 x 0.8
Lead (Pb)-free and halogen-free	Si8818EDB-T2-E1

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	30	V
Gate-source voltage		V_{GS}	± 12	
Continuous drain current (T_J = 150 °C)	T_A = 25 °C	I_D	2.2 [a]	A
	T_A = 70 °C		1.7 [a]	
	T_A = 25 °C		1.6 [b]	
	T_A = 70 °C		1.2 [b]	
Pulsed drain current (t = 300 μs)		I_{DM}	8	
Continuous source-drain diode current	T_A = 25 °C	I_S	0.7 [a]	
	T_A = 25 °C		0.4 [b]	
Maximum power dissipation	T_A = 25 °C	P_D	0.9 [a]	W
	T_A = 70 °C		0.6 [a]	
	T_A = 25 °C		0.5 [b]	
	T_A = 70 °C		0.3 [b]	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) [c]			260	

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum junction-to-ambient [a, d]	t ≤ 5 s	R_{thJA}	105	135	°C/W
Maximum junction-to-ambient [b, e]			200	260	

Notes

a. Surface mounted on 1" x 1" FR4 board with full copper, t = 5 s

b. Surface mounted on 1" x 1" FR4 board with minimum copper, t = 5 s

c. Refer to IPC/JEDEC® (J-STD-020), no manual or hand soldering

d. Maximum under steady state conditions is 185 °C/W

e. Maximum under steady state conditions is 330 °C/W

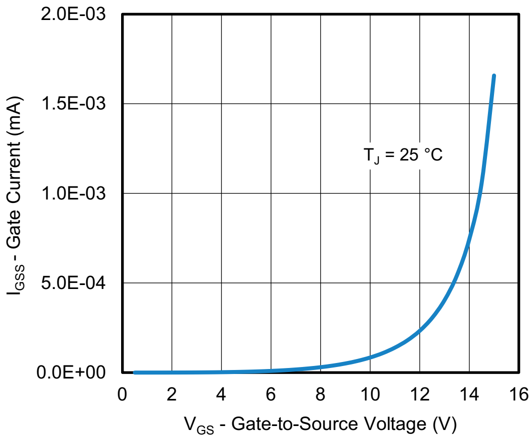
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 μA	30	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	I_D = 250 μA	-	30	-	mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$		-	-3.0	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 μA	0.6	-	1.0	V
Gate-source leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 4.5 V	-	-	± 0.1	μA
		V_{DS} = 0 V, V_{GS} = ± 12 V	-	-	± 1	
Zero gate voltage drain current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	-	-	1	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55 °C	-	-	10	
On-state drain current [a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	10	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 1 A	-	0.095	0.128	Ω
		V_{GS} = 4.5 V, I_D = 1 A	-	0.100	0.131	
		V_{GS} = 3.7 V, I_D = 1 A	-	0.105	0.134	
		V_{GS} = 2.5 V, I_D = 0.5 A	-	0.120	0.143	
Forward transconductance [a]	g_{fs}	V_{DS} = 10 V, I_D = 2 A	-	10	-	S
Dynamic [b]						
Input capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	-	206	-	pF
Output capacitance	C_{oss}		-	40	-	
Reverse transfer capacitance	C_{rss}		-	20	-	
Total gate charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 1 A	-	4.6	8	nC
		V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 1 A	-	2.4	4.5	
Gate-source charge	Q_{gs}		-	0.6	-	
Gate-drain charge	Q_{gd}		-	0.4	-	
Gate resistance	R_g	f = 1 MHz	-	4	-	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 15 Ω $I_D \cong$ 1 A, V_{GEN} = 4.5 V, R_g = 1 Ω	-	15	30	ns
Rise time	t_r		-	20	40	
Turn-off delay time	$t_{d(off)}$		-	20	40	
Fall time	t_f		-	10	20	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 15 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 1 Ω	-	5	10	
Rise time	t_r		-	10	20	
Turn-off delay time	$t_{d(off)}$		-	15	30	
Fall time	t_f		-	5	10	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	T_C = 25 °C	-	-	0.7	A
Pulse diode forward current	I_{SM}		-	-	8	
Body diode voltage	V_{SD}	I_S = 50 mA, V_{GS} = 0 V	-	0.56	1.0	V
Body diode reverse recovery time	t_{rr}	I_F = 1 A, di/dt = 100 A/μs, T_J = 25 °C	-	16	30	ns
Body diode reverse recovery charge	Q_{rr}		-	6	12	nC
Reverse recovery fall time	t_a		-	13.5	-	ns
Reverse recovery rise time	t_b		-	2.5	-	

Note

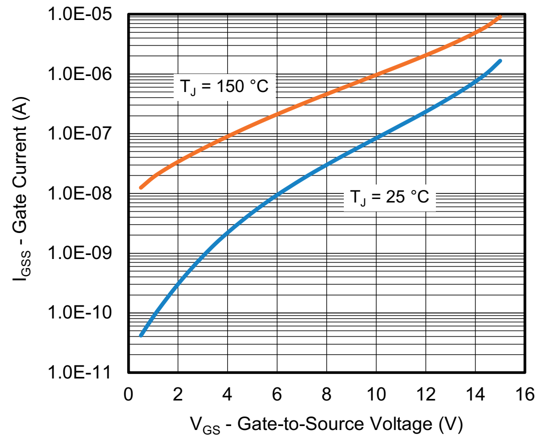
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing
c. Pulse diode forward transient current: pulse width at 100 ms, duty cycle ≤ 2 %. I_{SM} max. = 1.5 A

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

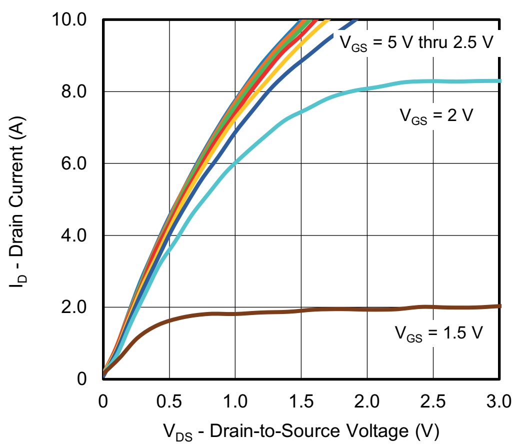
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



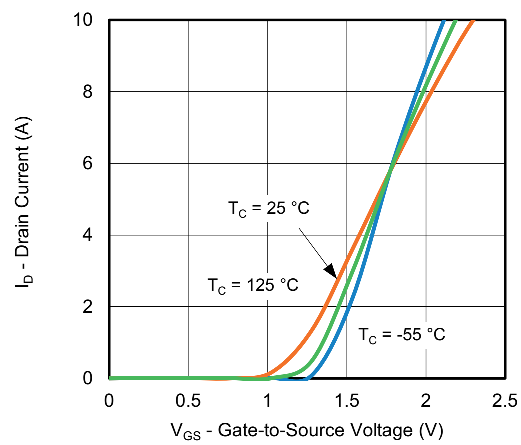
Gate Current vs. Gate-Source Voltage



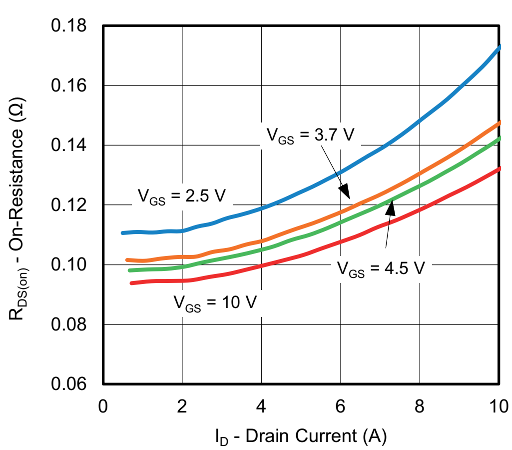
Gate Current vs. Gate-Source Voltage



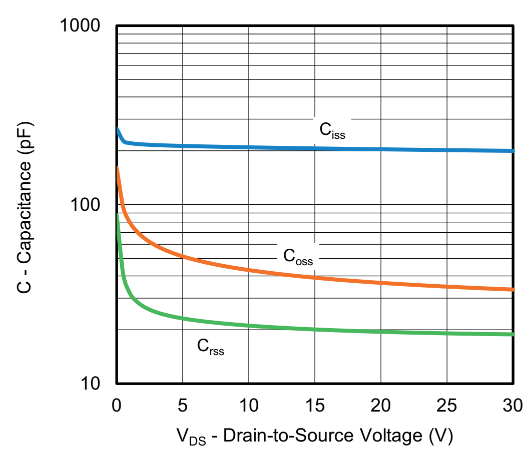
Output Characteristics



Transfer Characteristics

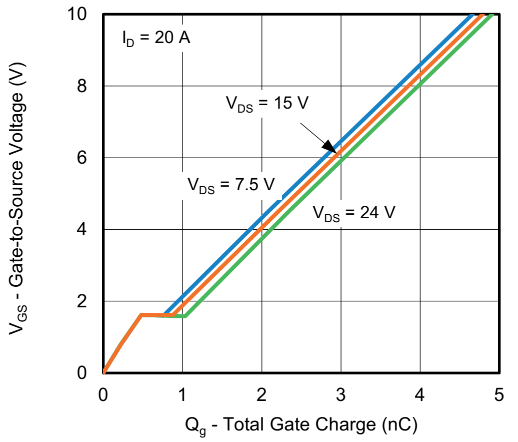


On-Resistance vs. Drain Current

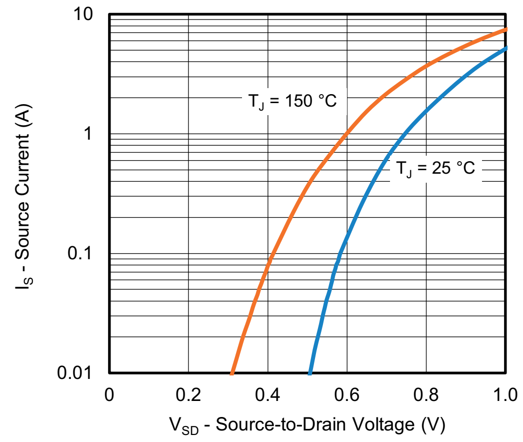


Capacitance vs. Drain-to-Source Voltage

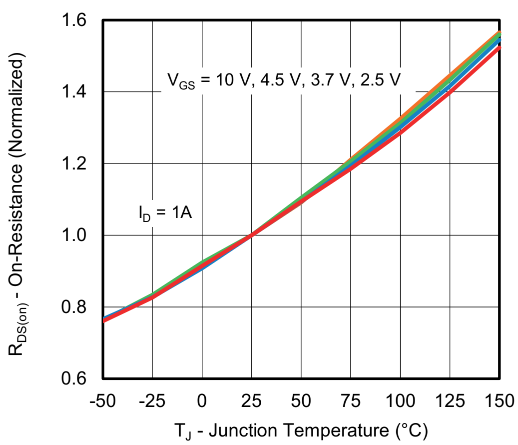
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



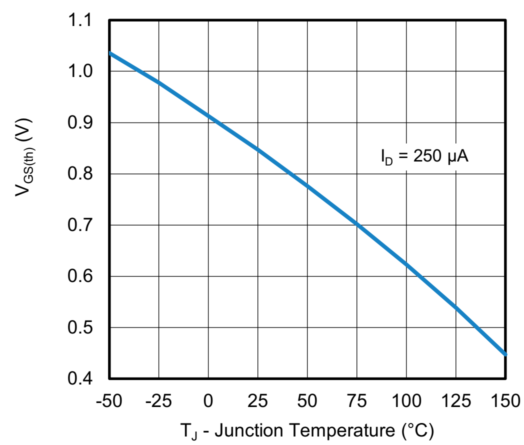
Gate Charge



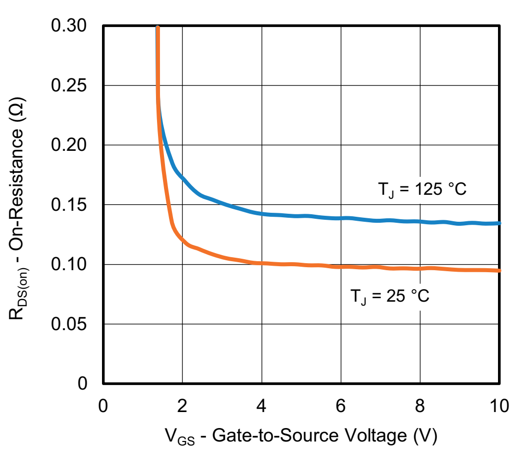
Source-Drain Diode Forward Voltage



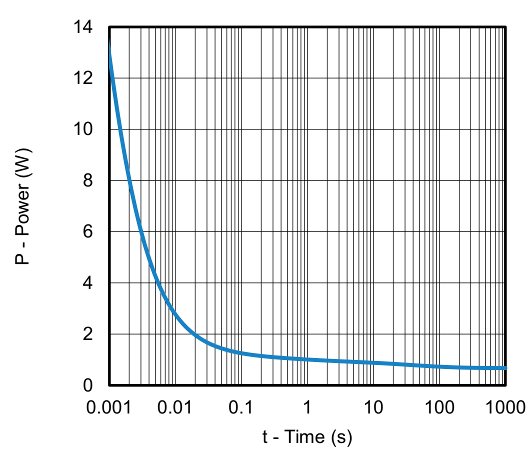
On-Resistance vs. Junction Temperature



Threshold Voltage



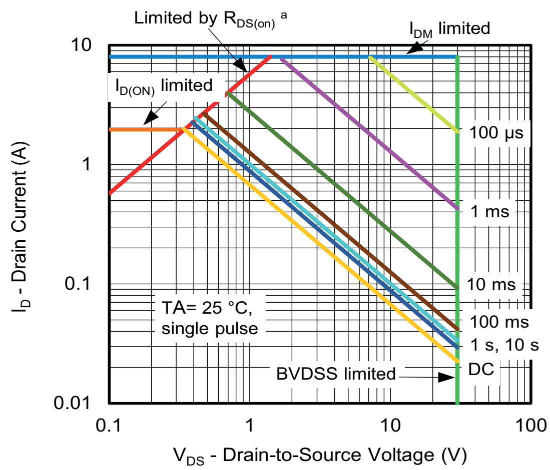
On-Resistance vs. Gate-to-Source Voltage



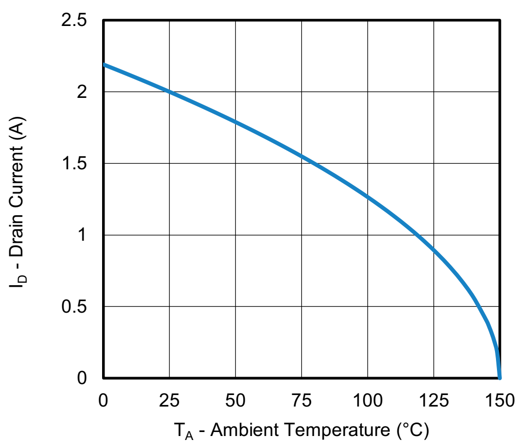
Single Pulse Power, Junction-to-Ambient

For technical questions, contact: pmostechsupport@vishay.com

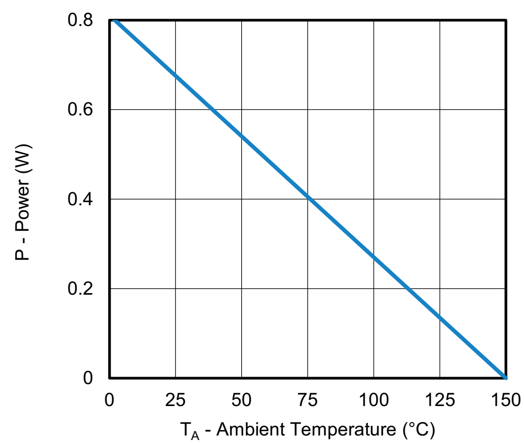
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Safe Operating Area, Junction-to-Ambient [b]



Current Derating [a, b]



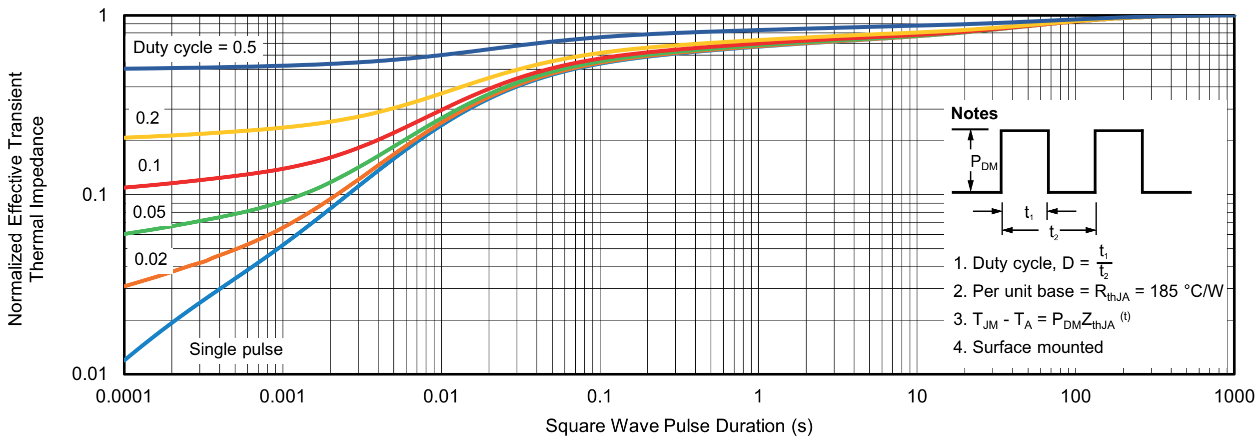
Power Derating [b]

Notes

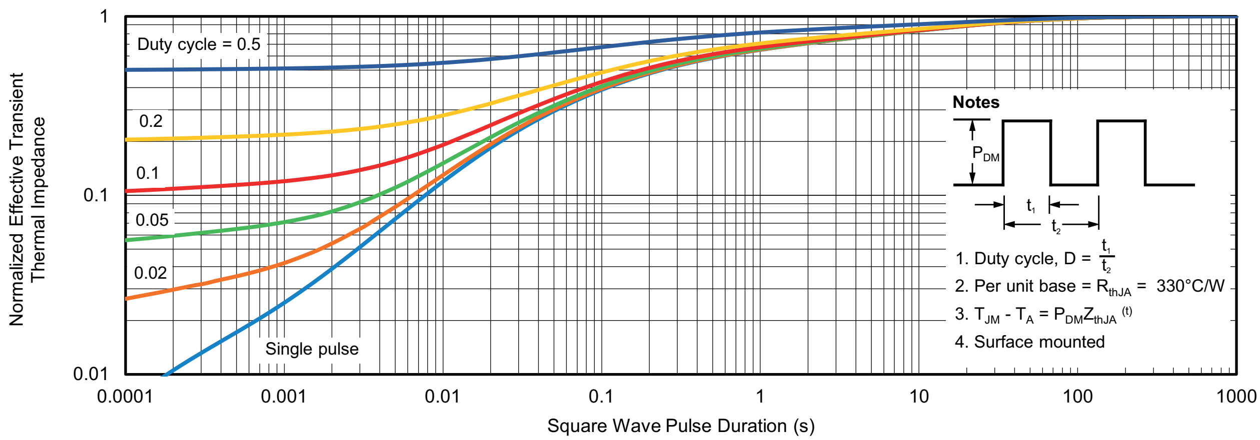
a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit

b. When mounted on 1" x 1" FR4 with full copper

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient (On 1" x 1" FR4 Board with Maximum Copper)



Normalized Thermal Transient Impedance, Junction-to-Ambient (On 1" x 1" FR4 Board with Minimum Copper)

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